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AUTHOR Rawnsley, David E.
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ABSTRACT

This analysis of major trends in the information dissemination industry focuses primarily on educational research. Specific aspects of the provision of information services discussed include policy questions, for both government and industry: the emerging role of the information counselor: networks and government agencies for educational information dissemination: developments in ERIC, the major educational information system: management information systems: information needs and search strategies: and technological developments. The overview is followed by a bibliography of ERIC documents which is divided into four categories: (1) dissemination/diffusion, (2) information services, (3) management information systems, and (4) international and foreign information activities. (SW)

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DEVELOPMENTS IN INFORMATION/DISSEMINATION 1977-1979

THE-STATE-OF-THE-ART

A PAPER SUBMITTED TO
THE SAN MATEO COUNTY OFFICE OF EDUCATION
(SAN MATEO EDUCATIONAL RESOURCES CENTER)

by

DAVID E. RAWNSLEY

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September 1, 1979

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DEVELOPMENTS IN INFORMATION/DISSEMINATION
1977-1979

THE-STATE-OF-THE-ART

The period between the late sixties and the late seventies has been dubbed by more than one author the "Information Decade."

We are said to live in an "information society" rather than a technical or industrial society. Wood, in her "Review of Scientific and Technical Numberic Data Bases" (1977, ED162904) reports that the federal government expends approximately 1 billion dollars per year on numeric data bases alone! (1 billion dollars is about equal to 1/6th of a "California Bail-out.") From the fewer than one dozen data bases existing in the mid-sixties, the field has expanded to include some 100 such data bases available from the three major data base vendors (Lockheed Corp. DIALOG, Systems Development Corp. ORBIT, and the relative new-comer, Bibliographic Research Service BRS). The data bases cover a tremendous variety of content, from marketing forecasts to foundation grants, but most of them are in areas of high technology. Williams (1977) provides a succinct overview of the vendors and the impact of interactive searching of these data bases, while Bina (1978) gives the results of testing some 20 of these files for their usefulness to educators with some interesting results.

The demand for information has made its collection, storage, and retrieval an interesting, exciting, and profitable field. The membership list of the Information Industry Association includes over 100 corporations. The range and variety of careers available in the field, rather or not one is highly trained or has the sacred MLS, is indicated by the interesting conference report by Minor (1977).

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There are a number of private corporations providing general information services to the public (the Information Store in San Francisco and FIND in New York are two examples), and, particularly in areas of high technology industry, a growing number of individuals who have made a profession of information consulting by retrieving (frcm any available source), analyzing, and reporting information to clients. These two ways of providing information services, particularly to industry and professionals, may represent a trend away from the type of consultant who helped design information systems for organizations to those who provide "digested" information. There is also a continued growth in specialized systems which generally combine a number of data bases relevant to a particular concern. As examples, Texas has a Natural Resources Information System, which is a networking of an enormous number of separate files, and a solar technology information network has been proposed for Tennessee (Gleaves 1977).

However, as one might expect in any field which is important and the subject of large demand, and particularly a field in which government has a leading role, the problem of policy is becoming more and more apparent, and may become a "critical issue" over the next decade. Information policy revolves around three questions:

---Who owns information (including the indices which allow the information to be retrieved)? Is it owned by the developer, the sponsoring agency, the vendor, the information intermediary, or (for all that information which is developed through support by government) the ultimate bill-payer, John Q?

---Who has access to information and under what conditions? Is it right or proper that the user must pay a third party (i.e., data base vendor) to gain access to an information file, such as the National Technical Information System (NTIS), which consists of information developed at taxpayer expense?

If it isn't right or proper, what are the options? Who has the responsibility for developing such things as a national bibliographic file, in order to assure public access?

---Who controls information? Can or should government prevent the exportation of information, or control it as it does other important or sensitive products? Is it even possible to do so, since information can travel in the brain, whereas wheat or guns are somewhat harder to hide? It is likely that everyone would agree that government should not control information flow internally, but as sponsor or operator of data bases, can it or any organization or entity avoid doing so, even by such a seemingly innocuous decision as to purge a file of old or "low quality" information?

The development of national information policy is a very complex issue. There are a number of documents in the ERIC file which provide insight into various aspects of the problem. Included are Bob (1977), Borman and Hays (1977), Martin (1977), and Welsh (1978). While these policy problems for the most part do not seem to directly effect educational information (our information has not too frequently been called "sensitive"), their solution or amelioration may have peripheral effects which can't be foreseen at this time. Given the highly technological nature of most of the information files or collections around which policy problems are being discussed, it is more likely that any effects will be felt more directly in higher than in secondary or elementary education.

While on the subject of public policy, the literature and experience seem to indicate, at least up to this point, that the new copyright law has not caused any major dislocations (in the education field) such as were predicted by some. However, there does not seem to be a tendency for publicly-funded agencies to make increased use of the copyright stamp, regardless of the public ownership of the information.

An emerging role in the information services field is that of the information counselor. This role, which falls between those of a field agent and a retrieval specialist, could be briefly described as a member of a professional team whose responsibilities are to analyze the information needs of the team, retrieve and synthesize relevant information, and report it back to the team. Although this role (under a variety of titles) seems to be developing rapidly, particularly in the health profession, there seems little formal recognition of it in education up to this point. However, one of the better documents on the role did emanate from the ERIC Clearinghouse on Information Resources at Syracuse (Dosa, 1977). Other documents which include discussion of the role are "Human Resources Networks in Community Gerontological and Health Information," (Dosa, 1977), the report on the New York Direction Service (City University of New York, 1977), and "Developing Clinical Information Needs and Systems" (Noback and Byrd, 1977). The information counselor function, which seems to relate to the need for information synthesis which will be discussed below, would appear to have interesting possibilities for management, planning, and development groups in education.

Dissemination, particularly in reference to bringing about use of the programs, products, and knowledge developed as a result of the federal investment in education, continues to be an important concern, especially at the federal and state levels, and in regional organizations such as R&D labs. However, there does seem to be a shift in emphasis from publishing and distributing program or product descriptions (such as the CEDaR and NIE catalogues, the ALERT system, or EDUCATION Programs That Work) to establishing organizations (centers, clearinghouses, exchanges, etc.) to disseminate

either within a particular content or problem area or to a particular clientele, or to provide linkage across resources. "Network" seems to be the present key-word. The proliferation of information resources is indicated by the several directories which have recently appeared in ERIC (Backer, 1977; Bina, et al, 1978; Consortium of Associations for Educational Dissemination, 1978; Far West Lab., 1978; Jeppson, 1977; Rivkin and Brecher, 1977. Erickson (1978) also provides a review of sources in special education). There would seem to be a developing need for an information service about information sources. The RDx (Research and Development Exchange) system is designed to serve this function at least in part, but its primary clientele are state departments, intermediate agencies, and large school districts. (See CMREL, 1977; Hull, 1977; Hofler, 1977.) The relationship between the RDx system and intermediate agencies (such as county offices in California) is unclear and a matter of concern (see Levis, 1979), and at least at the present it is difficult to see how five such exchanges spread over the nation could provide direct dissemination services to local schools, unless the range of "disseminates" is highly restricted.

The National Dissemination Network (NDN), an activity of the U.S. Office of Education, appears to have had considerable success in bringing about adaption and adoption of programs validated by a national board established for that purpose. (SRI, 1977; Emrick and Peterson, 1977) A distinctive feature of the NDN is that the original designers and implementors of the programs are directly involved in their dissemination. This and other features of the NDN appear to be directly derived from the 4-year study of educational innovation done by the Rand Corporation (Berman and McLaughlin, 1978). Examination of the role of the field agent (variously called a

change agent, linking agent, or extension agent) in educational change/improvement continues. Marker (1977) describes the four basic models (the RD&D model, the Social Interaction Model, the Problem Solver Model, and the Linkage Process Model) within which most of the activity in this field falls. One of the difficulties with the field agent concept is the problem of who will fill this function, and from what type of organization will they operate. We have perhaps come back to the intermediate agency.

One of the major efforts over the last few years has been in the State Information/Dissemination Capacity Building Program, under which a majority of state departments have received grants from NIE to build or improve their capacity to provide "general and comprehensive" information to local schools. From experience and what little documentation is available about activities within these grants, most of them share the common features of providing access to ERIC; building or laying the basis for building ERIC-compatible human resource and state "promising practices" files, and providing linkage services to schools through regional offices or intermediate agencies. (See, for example, the description of Connecticut's program in Nilson, 1977.)

However, as is inevitable, the federal bucks for these grants are limited in both time and amount. Some of these state programs are in their fourth of five years of funding. While some states would appear to have made a significant commitment to information/dissemination (Kansas, Texas, Illinois seem to be examples), it is at best unclear that individual states will continue to support these activities over the long run. Unfortunately, any major withdrawal among a number of states of information/dissemination support could substantially reduce the practitioners' ease of access to the

ERIC system, since these state programs are the only major new programs in the last five years or so (at least as far as known to this author) which included improving such access. And, again unfortunately, this may occur while ERIC is becoming more and more useful to practitioners.

Although the available literature about the State Capacity Building programs is not extensive or, for the most part, substantive, there is a good literature review (Strang 1977), a general description of considerations in evaluation of the grants (NTS 1977), and reports on state dissemination conferences (Herlig 1977).

The state of New Jersey developed an interesting approach to dissemination and linkage. New Jersey has had county offices of education since the early 1900's, but it seemed that the functions of these offices tended to compromise those necessary to helping schools (much like the "can the counselor discipline?" problem). So the state established four regional Education Improvement Centers, with responsibility for helping schools. Ogden (1977) describes the program, and provides testing evidence that indicates its success. Californians may be reminded of this state's PACE Centers, which existed from 1967 to 1971, and then were terminated. Someone was ahead of the times.

Some thirty-three states have some form of intermediate service agency, be it county offices, BOCES, educational service centers, regional SDE offices, or whatever. In an era of new agency-building, these agencies (with some significant exceptions) have not been given as active a (formal) role in information/dissemination as one might have expected. This may be changing, however, out of necessity. Levis (1978) provides an excellent review of ISAs, with particular reference to Michigan, and examines the problems

and possibilities in developing a working relationship between them and the RDx system. The particular role ISAs can play in rural settings is illustrated by Edington and Hays' (1977) review of innovative information activities by such agencies throughout the country.

Within educational information, the basic system, ERIC, continues to have an expansion rate of citations of over 20% per year. If anything, this rate will increase in the future. Development and field testing are also underway for two special files in educational practices and legal documentation, which will also increase the size of the information base. The natural resistance on the part of information users to review large numbers of documents to find the information they need, combined with this vast increase in the sheer quantity of information available, has led to increased interest on the part of ERIC and the Dissemination Group in NIE in providing information synthesis and/or analysis products. Such products have been available from ERIC clearinghouses (see, for example, Hensley, 1978 or Smith, 1977), but we can expect increased activity both from the clearinghouses and other sources in the future. The problems involved in producing these syntheses are the subject of a series of papers presently being prepared by individuals across the country for NIE; it will be interesting to see what means are suggested for the dissemination of synthesis products.

The distinction has been made between general information needs (that is, need for information about "critical" issues important to large numbers of information users, such as basic skills or vandalism) and specific information needs (that is, a need which is critical to an individual or small number of people at a particular time, but which is not

particularly critical to the majority). Major dissemination activities (such as the National Dissemination Network), and in all liklihood most information synthesis products, are by necessity directed toward general needs. Regardless of the expansion of these valuable activities, there will still be need for systems and services to meet specific needs, which may in fact be the source of the majority of information requests.

Along with the expansion of ERIC (which, it should be noted, has not only expanded in size, but also in variety of information included in its file), there has been an enormous expansion of other information and dissemination agencies in education over the past 5+ years. A quick look at five documents cited previously (i.e., Bina et al, 1978; Consortium of Associations for Educational Dissemination, 1978; Far West Lab, 1978; Jeppson, 1977; and Erickson, 1978) will indicate the plethora of resources available, and these lists are not exclusive. Along with these resources, many state departments are building information files on such subjects as human resources and promising practices within their states. Up to this time, the development of directories has represented the only major effort to synthesize information about information, and one must have sympathy for the school principal who is trying to find a single source for help with a specific problem. The history of educational information services has primarily been one of services directed toward a single issue (e.g., special education, women's equity, desegregation, vocational education, etc.) or servicing a single information source (e.g., ERIC). Perhaps we will see a trend toward developing single sources for the widest range of information possible. There are some slight indications that such a trend might exist in education as in other fields in two documents (Tessier et al, 1977 and Yazzie, 1977),

both of which are concerned with the expansion of the types of services or information handled by different ERIC Clearinghouses.

We should note what seems to be a change of emphasis in studies of users of information services/systems. This trend seems to be away from general surveys of information use, such as that summarized in "The Market for Educational Information" (ERIC Clearinghouse on Teacher Education, 1977), toward studies involved with the interface between user and system. Eidell (1977) deals in a pragmatic fashion with information and the educational administrator. Hall (1977), in an excellent study of an information system outside of education, puts forward the interesting concept of studying information use as an event, with the user and the system being parts of that event, rather than defining use in terms of the user. Chandler and Delutis (1977) have, as their basic concern in information system design, presented a means for including system performance and user requirements in the evaluation of an overall system. These types of studies promise to be much more useful in the management of information services than the more general studies popular in education over the past decade.

The ERIC system has evolved over the past several years into a collection of considerable use to practitioners, and, in fact, a collection with great potential for other users, such as recreation personnel or business and industry trainers. This evolution has been noticeable in both the document (RIE) collection and the journal (CIJE) index. Although some effort has been made to determine the usefulness of other data bases to educators (Bina, 1978 cited above), I know of no efforts to determine the usefulness, or encourage the use, of ERIC in other fields.

The expansion and evolution of ERIC has led to a number of efforts to

improve the indexing system. Modifications of the document type (PUBTYPE) field, and the addition of three new data fields having to do with the origin of documents, have been made too recently to determine their effect. Perhaps the most significant effort has been an extensive vocabulary study, which will result in the production of a refined thesaurus and computer tapes based on it. These products are due in the Fall of 1980 (see Booth, "A New ERIC Thesaurus, Fine-tuned for Searching," in On-line, July 1979). Hopefully this effort will mitigate some of the criticisms of the ERIC system, or at least those criticisms which are constructive. The continued expansion of the system, both in terms of size and variety of content, would seem to make it a reasonable time for the development and refinement of search strategies tailored to the purposes and expected outcomes of a given search request. It would seem reasonable that search strategies would differ depending upon whether the user is trying to build a bibliography, find examples of a particular type of document (e.g., examples of learning activities), or attempting an extensive retrospective search. At best, differing strategies are carried in the heads of experienced searchers; with the continued expansion in the numbers of intermediaries doing on-line interactive searching, these strategies should be made explicit and useable.

This problem of explicit search strategies to meet specific needs may become more important as educators (and those who provide services to them) become more aware of the potential usefulness of files other than ERIC. In the information field in general, there seems to be less concern than in prior years with technical aspects of file design, and more concern with the point of access of the user, and the role of intermediaries in the interface between the user and the information. Part of this trend includes concern with comprehensive services -- that is, services which respond from a

number of files and other information sources, rather than from a single source. Work is being done, particularly in relation to technical information files, to provide programs which will enable a searcher to access a number of files, simultaneously, regardless of differences in file language and design.

Perhaps the most significant technological development in the information field over the last decade has been the movement from batch searching to interactive, on-line searching. Although it is always "iffy" to make statements about the future, it would seem that further significant changes in technology will stem from three factors:

---The tremendous reduction in the price of computer-connected hardware may considerably reduce the "distance" between ultimate information users and the sources of information. We have all heard of the dream of a mini-computer in every home which, we suppose, will go along with the chicken in the pot and the car(s) in the garage. However, there is, as usual, a "caveat" for all we prospective "emptors" in that the cost of software seems to increase as the cost of hardware goes down. The supply of competent programmers is way behind the current and foreseeable demand, with the inevitable result of increasing costs.

---There are important developments in the technology of computer memories which promise to enable us to store quantities of information previously inconceivable. As an example, we may be nearing the time when it will be possible to store and retrieve from a computer not only citations and abstracts of documents, but the whole documents themselves. The temptation to store trivia may be overwhelming!

---Capabilities to communicate information across great distances and within

short time-spans are increasing rapidly through such means as lasers, laser holographs, satellites, and advanced TV technology. Two-way TV is presently possible, particularly within cable systems. How these developments can best be used in education and elsewhere is both a question of public policy and professional challenge. Their significance in relation to such matters as the organization of libraries, information systems, and (potentially) schools, will be a major concern for a number of years.

One area in which technological advance has not, it seems, been matched by need is that of the use of microforms. There seem to have been no great improvements in microfiche readers in a long time, if ever. This should be a major concern of systems like ERIC which, for good economic reasons, will continue to depend on microfiche for the near future at least. Any device which would enable the reader screen to be moved independently of the projection equipment would be more than welcome.

Interest in management information systems (that is, systems designed to provide managers with information about the functioning of their organizations, as compared with information systems designed to provide information for an "outside" clientele) are a continuing concern of vocational and career educators (see, for example, Caldwell, 1977 or Lane Community College, 1977). However, in contrast with the late '60s and early '70s, when management information systems were part of the PPBS movement, there seems to be less interest in applying MIS technology to school management. The difficulty (if not impossibility) of making a quantifiable connection between inputs (resources) and outcomes in education may be the major factor in reduced interest in this type of information system.

As a final point, it may be salutory to point out that the "information

society" is not just an American phenomena, either in terms of information in general, or educational information in particular. Many nations and groups of nations (such as the European Community) are making considerable efforts in the development of comprehensive information systems, and in the building of ERIC-like Educational resources. The problems in building thesauri in multilingual settings are formidable. UNESCO and other international organizations are also involved in studies of potential interfaces between scientific data banks, with the ideal of enabling scientists throughout the world to benefit from each other's work. It is in these areas where the questions of technological capabilities and national policies become most obvious. Whether we are looking at the international or the national scene, the next decade will be of great importance in determining whether we will be the victims or the benefactors of the information explosion.

David E. Rawnsley

AN ERIC-BASED BIBLIOGRAPHY
ON
EDUCATIONAL INFORMATION AND DISSEMINATION

This bibliography, with some few exceptions, has been drawn from materials cited in ERIC during the period January 1977 to April 1979. It was developed as the basis for a state-of-the-art paper, and thus does not include a number of citations which, in the bibliographer's opinion, are trivial, redundant, or of peripheral relevance.

The bibliography is divided into four sections, with considerable overlap among them.

A. Dissemination/diffusion - Documents primarily concerned with systems or programs involved in bringing about educational change through the dissemination of R&D "products."

B. Information Services - Documents germane to systems for the collection, storage and retrieval of information in the general sense.

C. Management Information Systems.

D. Documents describing international or foreign information activities.

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